network

Flashlink User Manual

ETH1000MC

Gigabit Ethernet Media Converter

Rev. 6

network-electronics.com

1 Revision history

The latest version is always available in pdf-format on our web-site:

http://www.network-electronics.com/

Revision	Date	Description
6	2007-10-26	New front page and removed old logo.
5	2007-10-05	Added Materials Declaration and EFUP
4	2006-02-22	Reduced maximum optical input power to -6dBm
3	2005-10-25	Added specification for jumbo frames
2	2005-02-21	Completed list of laser options
1	2004-08-10	*First version*
0	2004-01-30	*Initial version*

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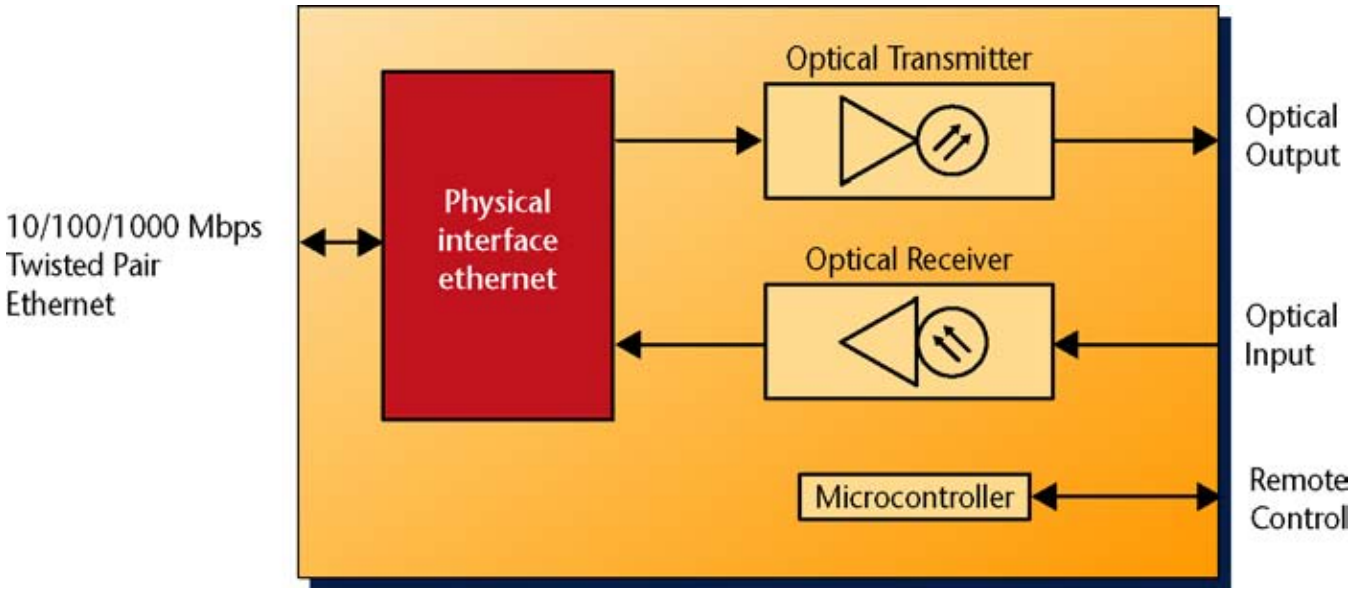
3 Versions

There is only one version of the ETH-1000MC.

4 Overview

The flashlink ® ETH1000MC is a 1000Base-T to fibre converter module in the Network flashlink family. The module converts a standard 1000 Mbit/s Ethernet signal on copper to fibre suitable for long haul applications. The module has one electrical Ethernet port, and one fibre transceiver port (receiver fibre connector and transmit fibre connector). The speed on the electrical connector is dependent of the DIP switch setting. Speed will upon link connection automatically be set the highest possible. User can independently enable or disable 10Mbit, 100Mbit or 1000Mbit. The fibre link can be used in one or two fibre installations, or occupy two wavelengths in a WDM, CWDM or DWDM installation.



5 Specifications

Optical input:

Sensitivity:	Better than –25dBm
Optical wavelength:	1200nm – 1610nm
Transmission circuit fibre:	Single mode 9/125um compatible
Return loss:	>40dB with single mode fibre
Detector damage threshold:	>+1dBm
Max input power:	-6 dBm
Connector:	SC/UPC

Optical output:

Transmission circuit fibre:	Single Mode
Light source:	F-P/DFB Laser
Optical wavelength:	See *Laser Options* below

Ethernet:

10BaseT/100BaseTx/1000BaseT on RJ-45 connectors, compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3z, speed auto sensing and auto MDI/MDI-X. ETH1000MC supports jumbo frames up to 16000 bytes.

Electrical

Power:	+5V DC/2W
Control:	Control system for access to setup and module status with BITE (Built-In Test Equipment)

6 Laser options

The ETH1000MC card is available in these versions:

Part number	Wavelength	Laser type	Output power	Receiver sensitivity
ETH1000MC-13T, -7.5dBm	1310 ±40 nm	Fabry-Perot	-7.5 dBm	Better than –25 dBm
ETH1000MC-C1270, 0dBm	1270 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1290, 0dBm	1290 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1310, 0dBm	1310 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1330, 0dBm	1330 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1350, 0dBm	1350 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1370, 0dBm	1370 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1390, 0dBm	1390 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1470, 0dBm	1470 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1490, 0dBm	1490 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1510, 0dBm	1510 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1530, 0dBm	1530 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1550, 0dBm	1550 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1570, 0dBm	1570 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1590, 0dBm	1590 ±6 nm	DFB	0 dBm	Better than –25 dBm
ETH1000MC-C1610, 0dBm	1610 ±6 nm	DFB	0 dBm	Better than –25 dBm

7 Connector module

The ETH1000MC has a dedicated connector module: ETH1000MC-C1. This module is mounted at the rear of the sub-rack

7.1 Mounting the connector module

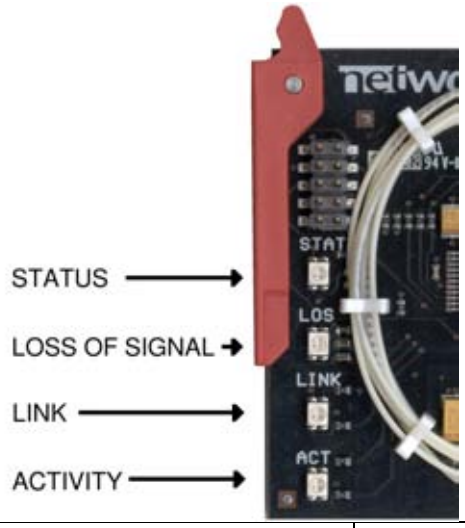
The details of how the connector module is mounted, is found in the user manual for the sub-rack frame FR-2RU-10-2.

This manual is also available from our web site: http://www.network-electronics.com/

8 Status indicators

8.1 Front Panel LEDs

The status of the module can be easily monitored visually by the LED's at the front of the module

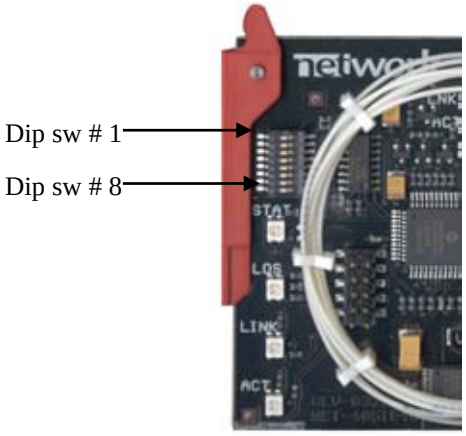


LED	Description	Green light	Yellow light	Red light	No light
STAT	Module status	Module self-test is OK and power is present.		• Module initialising (takes approx. 2 sec). • The laser is turned off. • Module is faulty (fuse blown, laser failure, laser APC out of lock, etc). The card needs factory repairment.	Module has no power.
LOS	Loss of optical signal	Optical input signal present. Note: This is an optical measurement, a green light does not imply that there exists a valid Ethernet signal on the optical input.		• No optical input signal. • Check fibre connection. • Check card in opposite end.	
LINK	Ethernet link	Ethernet link to opposite end established at 1000Mbit	Ethernet link to opposite end established at 10 or 100Mbit		Ethernet link to opposite end not established.
ACT	Ethernet activity	Flashes when Ethernet packets are sent over the fibre link. When the Ethernet activity is high, this will be on continuously.			The fibre link is idle, no packets are sent on the link.

8.3 Dip switches

The tables below explains the functionality of the dipswitches shown in the below figure.

Dip switch #	Description
1	Enable 10Mbit
2	Enable 100Mbit
3	Enable 1000Mbit (GbE)
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Gyda override/DIP



When DIP switch 1,2 and 3 are all on or all off, highest speed possible will be used when link connection.

Switch 1 disables 10Mbit connection when DIP is closest to board edge. Switch 2 enables/disables 100Mbit and switch 3 enables/disables 1000Mbit.

Dip 4, 5, 6 and 7 are reserved.

Dip 8 sets if Gyda is able to configure or not. When Gyda override is set, the actual setting can be read by using the info command (se Gyda user manual for details).

9 Laser safety precautions

Guidelines to limit hazards from laser exposure:

Note: All the available EO (including ETH1000MC) units in the flashlink® range include a laser. Therefore this note on laser safety should be read thoroughly.

The lasers emit light at wavelengths around 1310 nm or 1550 nm. This means that the human eye cannot see the beam, and the blink reflex cannot protect the eye. (The human eye can see light between 400 nm to 700 nm).

A laser beam can be harmful to the human eye (depending on laser power and exposure time). Therefore:

!! BE CAREFUL WHEN CONNECTING / DISCONNECTING FIBRE PIGTAILS (ENDS).

NEVER LOOK DIRECTLY INTO THE PIGTAIL OF THE LASER/FIBRE.

NEVER USE MICROSCOPES, MAGNIFYING GLASSES OR EYE LOUPES TO LOOK INTO A FIBRE END.

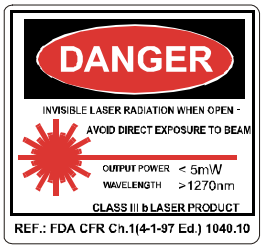
USE LASER SAFETY GOGGLES BLOCKING LIGHT AT 1310 nm AND AT 1550 nm

Instruments exist to verify light output power: Power meters, IR-cards etc.

flashlink® features:

All the laser module cards in the flashlink® product range, are Class 1 laser products according to IEC 825-1 1993, and class I according to 21 CFR 1040.10 when used in normal operation.

More details can be found in the user manual for the FR-2RU-10-2 frame.
Maximum output power*: 5 mW.
Operating wavelengths: > 1270 nm.
**Max power is for safety analysis only and does not represent device performance.*



10 Declaration of conformity with CE

This apparatus meets the requirements of EN 55103-1 (November 1996) with regard to emissions, and EN 55103-2 (November 1996) with regard to immunity; it thereby complies with the Electromagnetic Compatibility Directive 89/336/EEC.

11 General environmental requirements for Network flashlink® equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:

- Operating room temperature range 0°C to 40°C
- Operating relative humidity range up to 90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:

- Temperature range -10°C to 50°C
- Relative humidity range up to 95% (non-condensing)

3. Electromagnetic compatibility conditions:

- Emissions EN 55103-1 (Directive 89/336/EEC)
- Immunity EN 55103-2 (Directive 89/336/EEC)

12 Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Network Electronics ASA. These conditions are available on the company web site of Network Electronics ASA:

www.network-electronics.com

13 Materials declaration and recycling information

14 Materials declaration

For product sold into China after 1st March 2007, we comply with the "Administrative Measure on the Control of Pollution by Electronic Information Products". In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
ETH1000MC	X	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

15 Environmentally-friendly use period

The manual must include a statement of the "environmentally friendly use period". This is defined as the period of normal use before any hazardous material is released to the environment. The guidance on how the EFUP is to be calculated is not finalised at the time of writing. See http://www.aeanet.org/GovernmentAffairs/qfLeOpAaZXaMxqGjSFbEidSdPNtpT.pdf for an unofficial translation of the draft guidance. For our own products, Network Electronics has chosen to use the *50 year figure* recommended in this draft regulation.

Network Electronics suggests the following statement on An "Environmentally Friendly Use Period" (EFUP) setting out normal use:

> **EFUP is the time the product can be used in normal service life without leaking the hazardous materials. We expect the normal use environment to be in an equipment room at controlled temperature range (0ºC - 40ºC) with moderate humidity (< 90%, non-condensing) and clean air, not subject to vibration or shock.**

Further, a statement on any hazardous material content, for instance, for a product that uses some tin/lead solders:

> **Where a product contains potentially hazardous materials, this is indicated on the product by the appropriate symbol containing the EFUP. The hazardous material content is limited to lead (Pb) in some solders. This is extremely stable in normal use and the EFUP is taken as 50 years, by comparison with the EFUP given for Digital Exchange/Switching Platform in equipment in Appendix A of "General Rule of Environment-Friendly Use Period of Electronic Information Products". This is indicated by the product marking:**

It is assumed that while the product is in normal use, any batteries associated with real-time clocks or battery-backed RAM will be replaced at the regular intervals.

The EFUP relates only to the environmental impact of the product in normal use, it does not imply that the product will continue to be supported for 50 years.

16 Recycling information

Network Electronics provides assistance to customers and recyclers through our web site http://www.network-electronics.com. Please contact Network Electronics' Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Network Electronics or its agents for recycling, the following general information may be of assistance:

Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.

All major parts are marked or labelled to show their material content.

Depending on the date of manufacture, this product may contain lead in solder.

Some circuit boards may contain battery-backed memory devices.